Figure 1: Screening libraries of chimeric promoter sequences
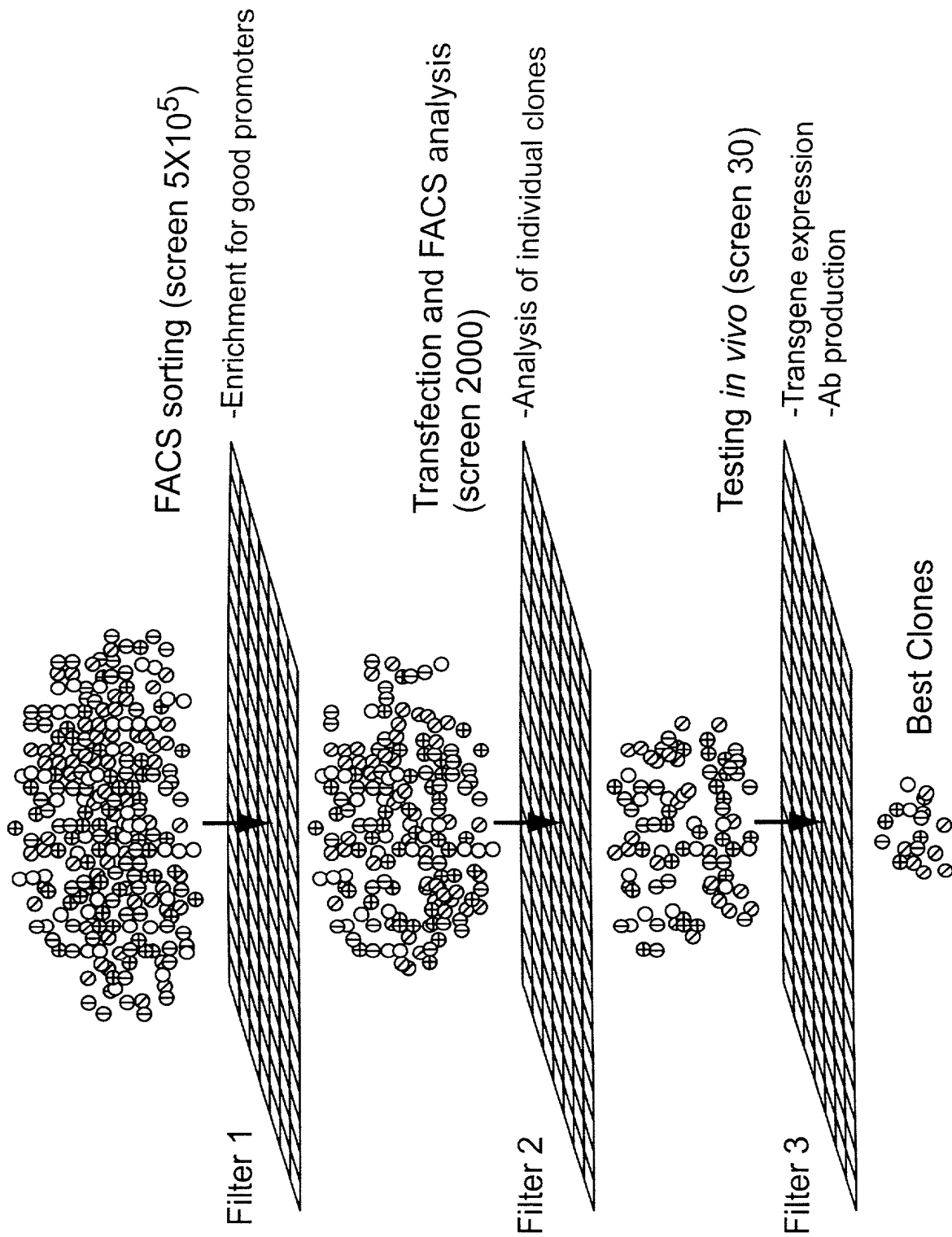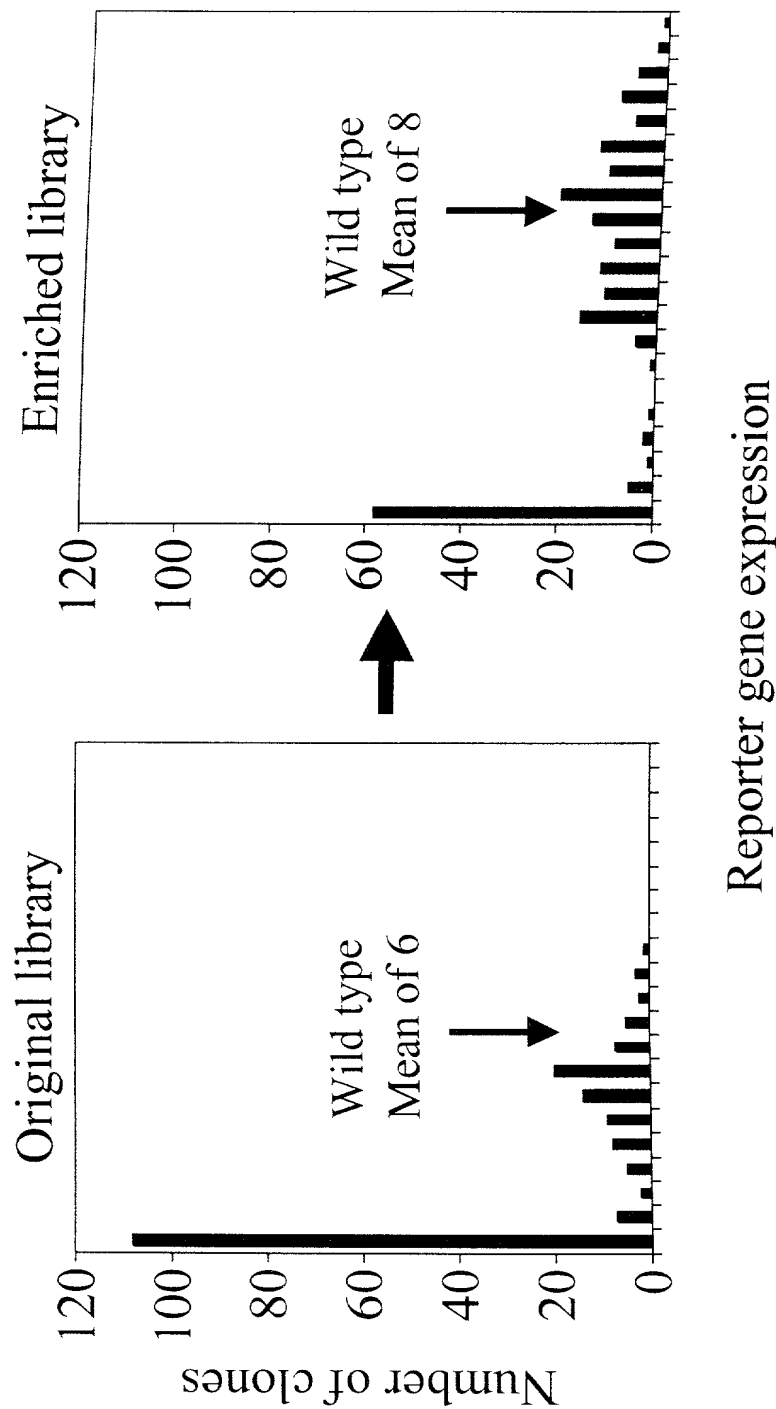

FACS sorting (screen 5X10⁵)

-Enrichment for good promoters

Transfection and FACS analysis (screen 2000)

-Analysis of individual clones

Testing *in vivo* (screen 30)

-Transgene expression
-Ab production

Filter 1

Filter 2

Filter 3

Best Clones

Figure 2: Enrichment of chimeric promoter libraries by FACS sorting
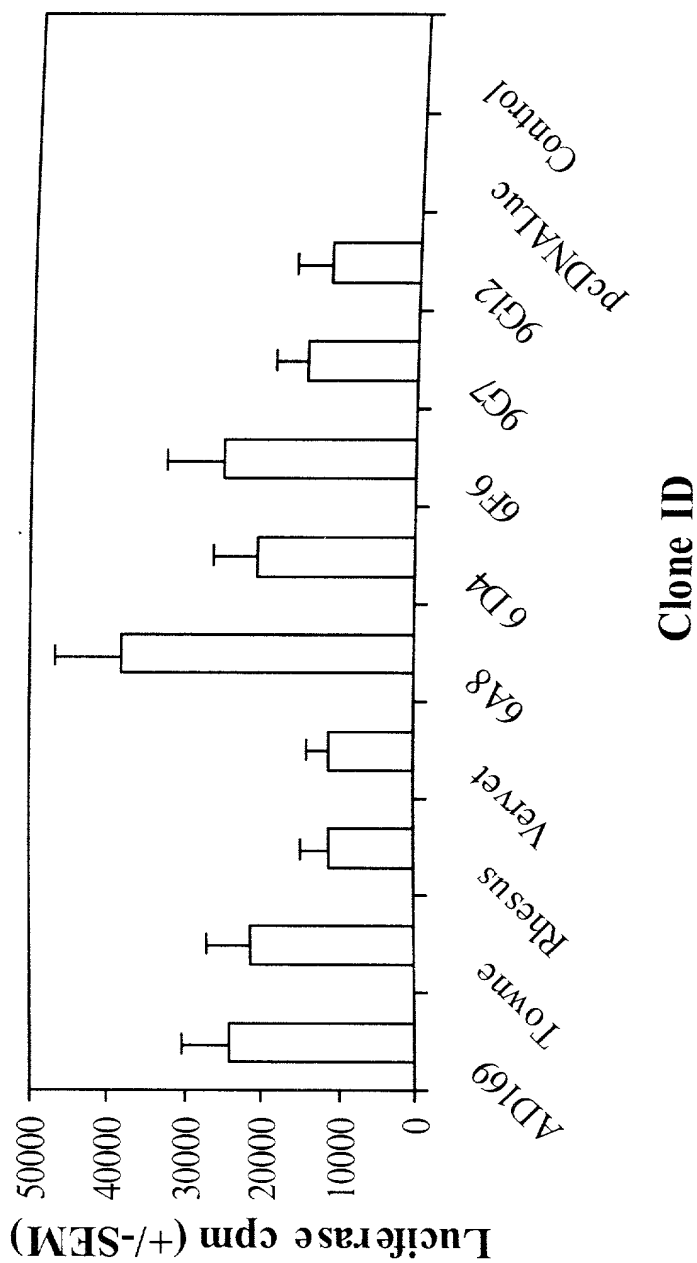
Figure 3: Diverse activities of chimeric promoter sequences in transfected cells
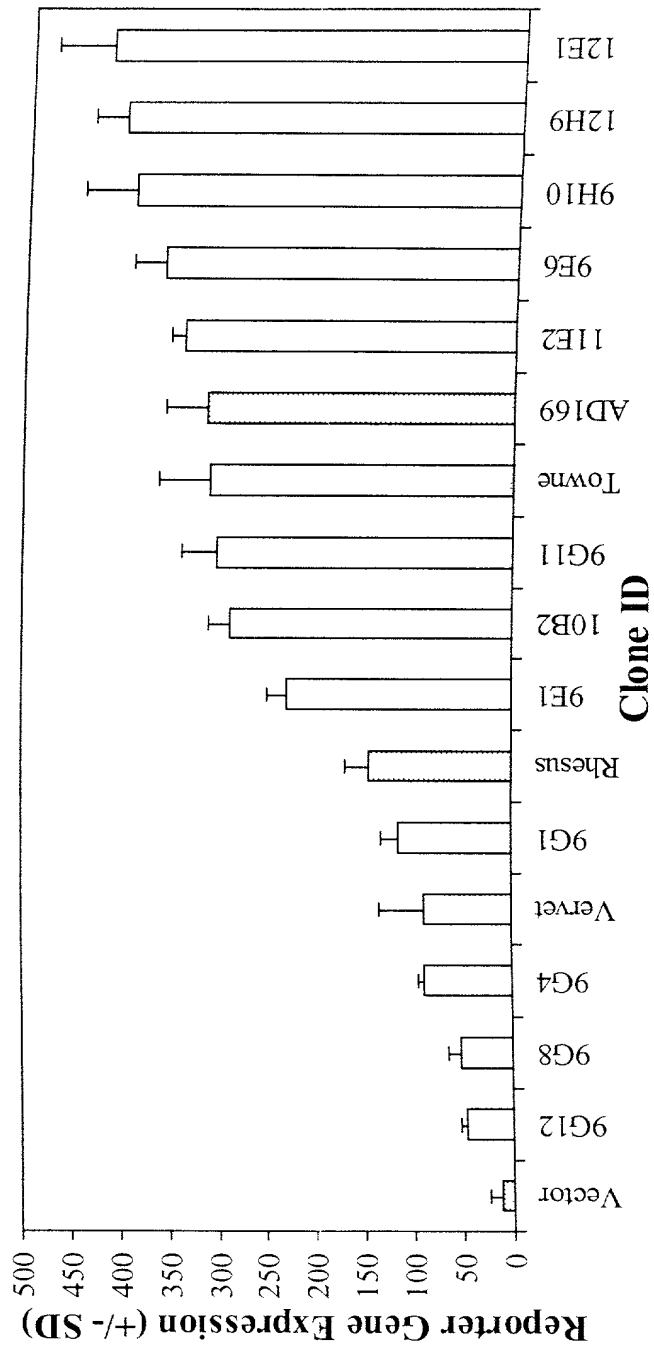
Figure 4: Luciferase expression in muscle 7 days after plasmid injection

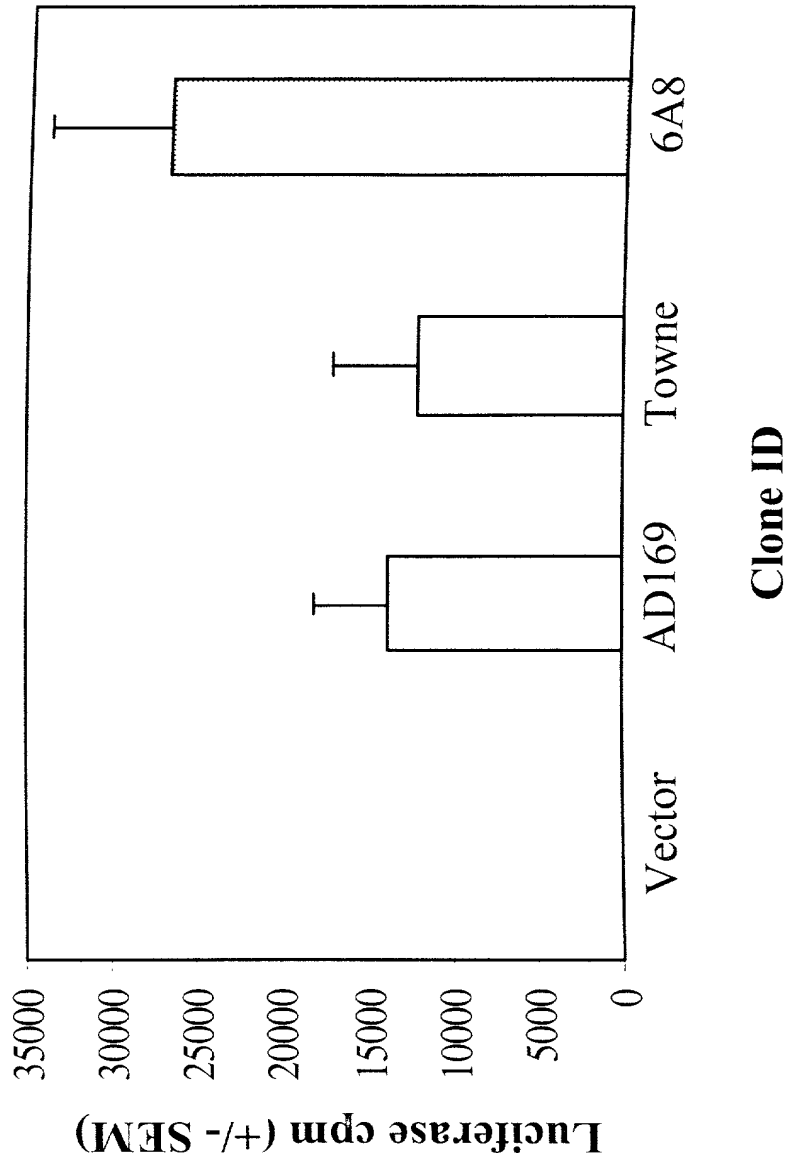Figure 5: Comparison of Luciferase expression from clone 6A8 and parental clones

Figure 6A: Antibody responses following injection with β-galactosidase-encoding plasmid
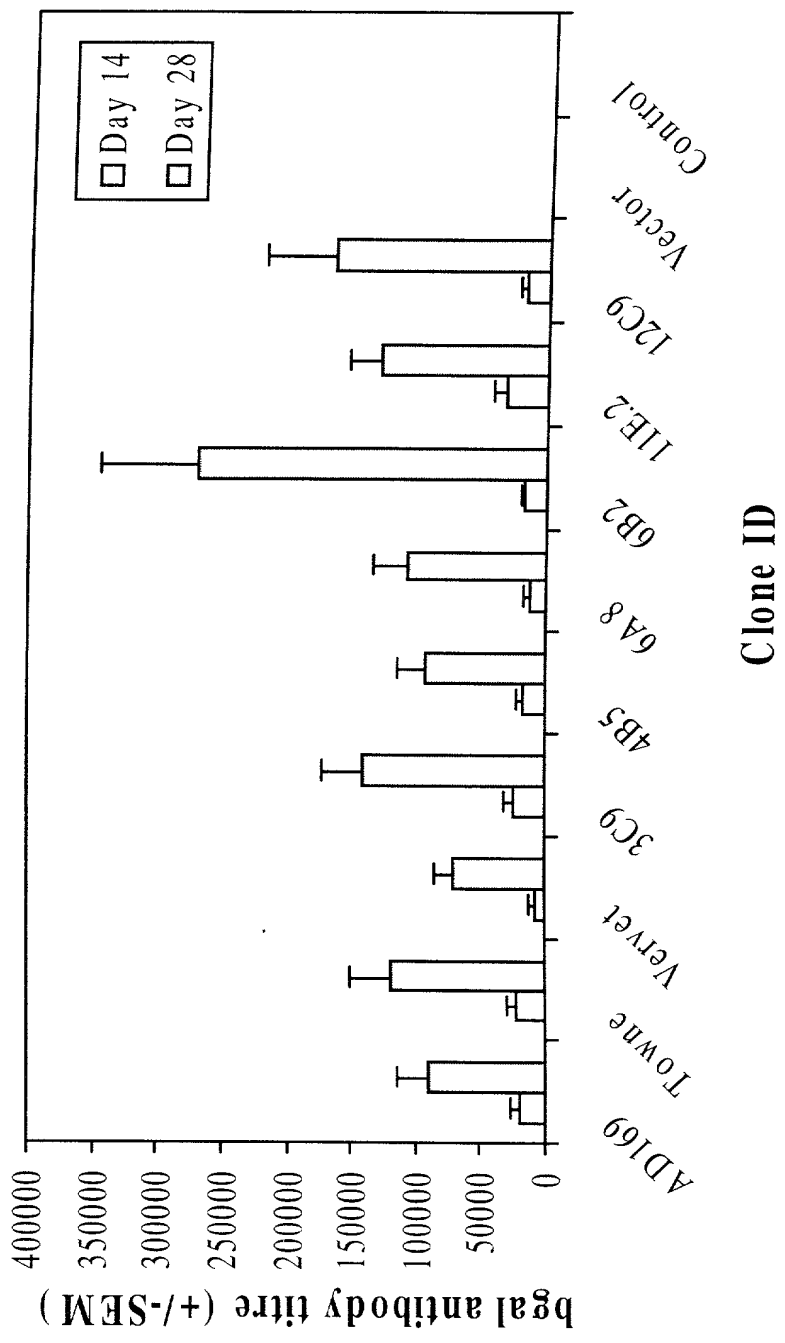
Figure 6B: Improved Ab Response by Shuffled Promoter

Ab titer x 10^{-4} (β-gal)

Control   Rhesus   Vervet   Towne   AD169   12E1

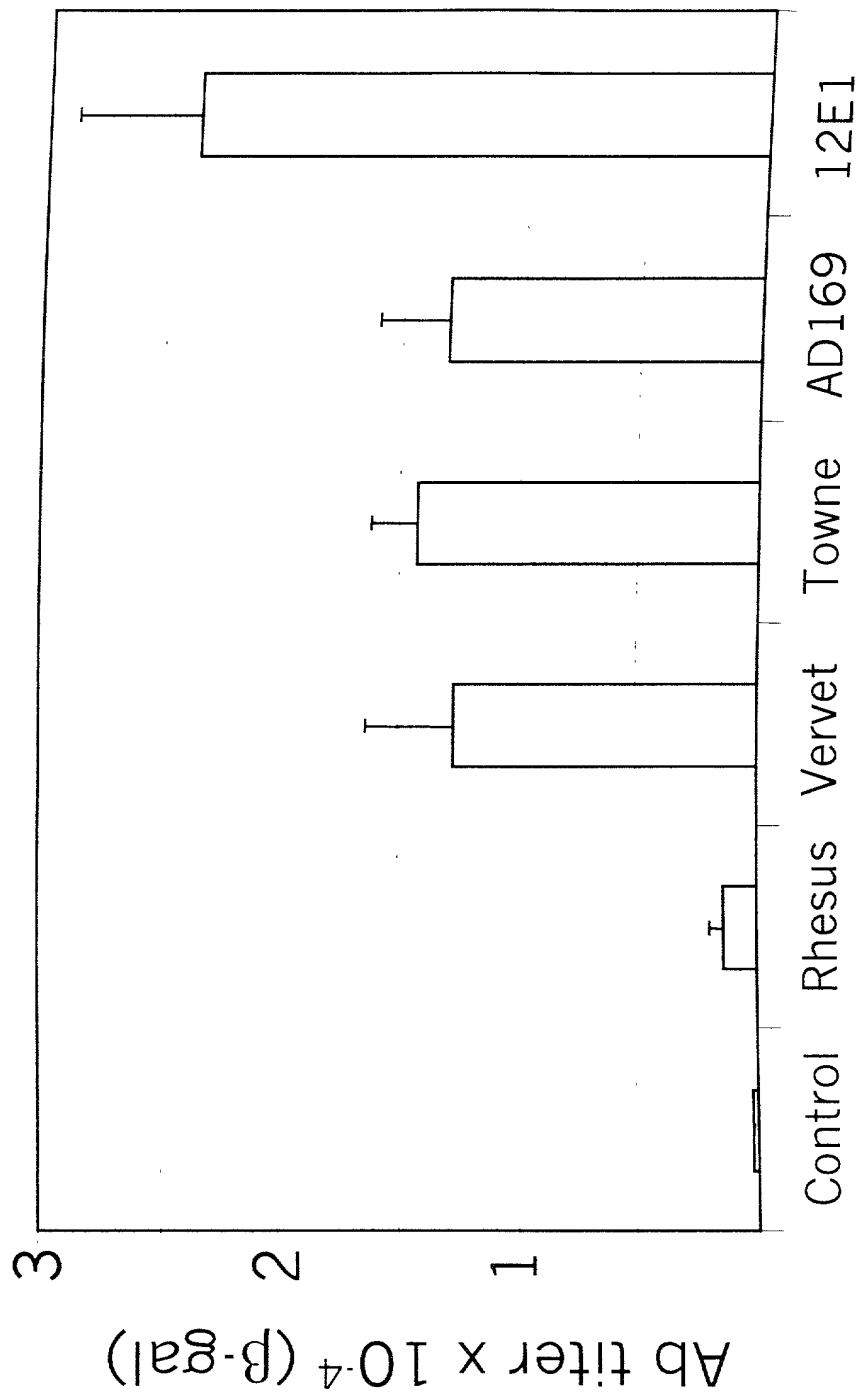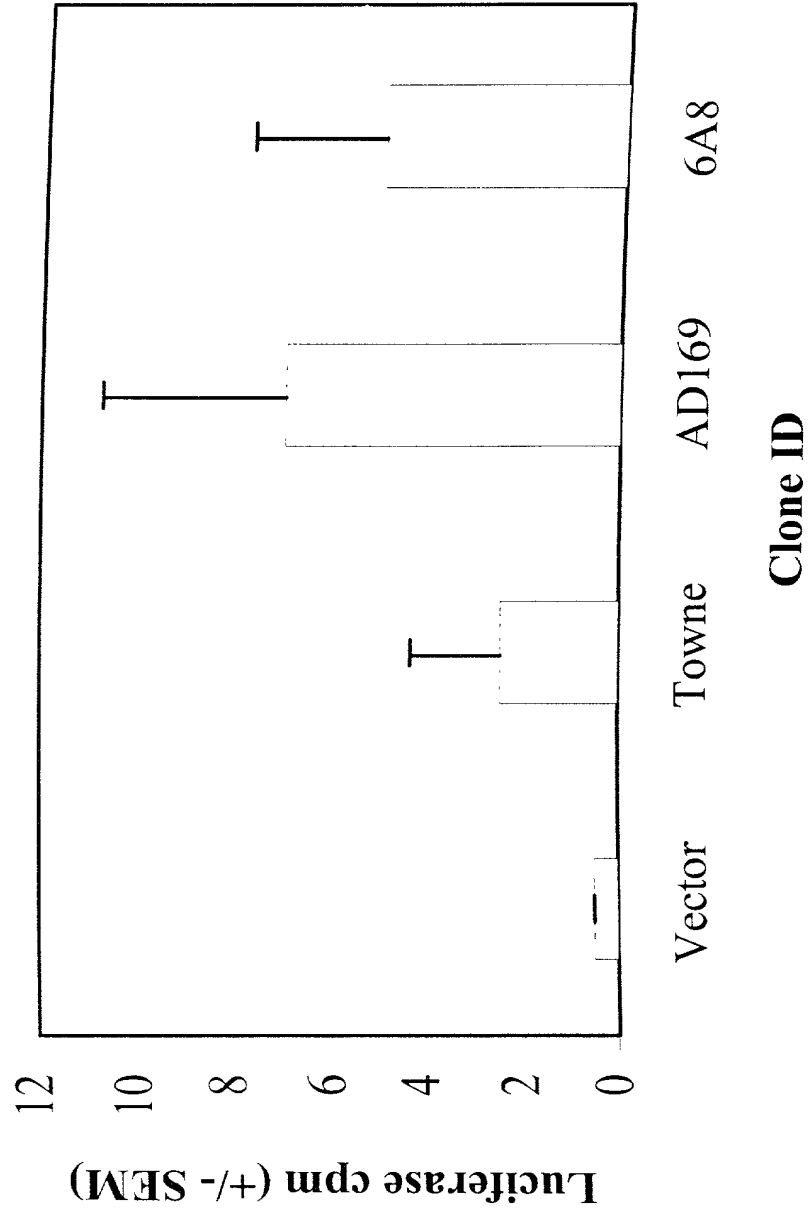Figure 7: Chimeric promoter 6A8 is functional in human muscle tissue

Figure 8A: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

FIG. 8B. FIG. 8B.

Figure 8B: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

Sequence alignment (positions 201–400):

Sequence	Start		Start	
10B2	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
11E2	(201)	ACTGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
12C9	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
12E1	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
12H9	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
3C9	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
4B5	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACTGCCCAACGACCCCGCCCATTGACGTCAATAACGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
6A8	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAGCTT	(301)	ACGGTAGATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
6B2	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
6D4	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
6F6	(201)	ACCGCCATGCTGACATTGATTATTGACTAGTTATTAACAGTAATCAATTCAGGGGTCATCAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAGATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAGTGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
9E1	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
9F11	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
9G11	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
9G12	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
9G4	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
9G7	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
9G8	(201)	ACCCCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTTATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
AD169	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT
Towne	(201)	ACCGGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTCG-TGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCAT.
Consensus	(201)	ACCGCCATGTTGACATTGATTATTGACTAGTTATTAATAGTAATCAATTCAGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTACATAACTT	(301)	ACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCGCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATT

(Position marker: 300 at top of first block; 400 at top of second block)

Figure 8C: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

```
                                                                                                    500
10B2      (401) GACGTCAATGGGTGGAGTATTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
11E2      (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCTCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACG-CCCCCTATTGACGTCAATGACGGTA
12C9      (401) GACGTCAATGGGTGGGGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
12E1      (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
12H9      (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
3C9       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
4B5       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
6A8       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
6B2       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
6D4       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACG-CCCCCTATTGACGTCAATGACGGTA
6F6       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
9E1       (319) -----------------------------------------------------------------------------------------------------
9F11      (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
9G11      (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
9G12      (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
9G4       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
9G7       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
9G8       (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCCTATTGACGTCAATGACGGTA
AD169     (401) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTACG,-CCCCCTATTGACGTCAATGACGGTA
Towne     (400) GACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG-CCCCC----TATTGACGTCAATGACGGTA
Consensus (401) GACGTCGATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTCCG CCCCCTATTGACGTCAATGACGGTA

                                                                                                    600
10B2      (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGGCTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
11E2      (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
12C9      (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
12E1      (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
12H9      (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
3C9       (501) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
4B5       (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
6A8       (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
6B2       (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
6D4       (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
6F6       (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
9E1       (319) -----------GGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTGTTACCATCGTGATGCG
9F11      (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
9G11      (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
9G12      (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
9G4       (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
9G7       (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTGTTACCATGGTGATGCG
9G8       (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
AD169     (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTATGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
Towne     (500) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
Consensus (501) AATGGCCCGCCTGGCATTATGCCCAGTACATGACCTTACGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCG
```

Figure 8D: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

```
                    601                                                                               700
10B2      (600)  GTTTTGGCAGTACCACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
11E2      (600)  GTTTTGGCAGTACCACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCTATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
12C9      (600)  GTTTTGGCAGTACCACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCTATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
12E1      (600)  GTTTTGGCAGTACCACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
12H9      (600)  GTTTTGGCAGTACCACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
3C9       (601)  GTTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
4B5       (600)  GTTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
6A8       (600)  GTTTTGGCAGTACACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
6B2       (600)  GTTTTGGCAGTACACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGG------
6D4       (600)  GTTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGG------
6F6       (600)  GTTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
9E1       (407)  GTTTTGGCAGTACACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTCTTGGCACCAA
9F11      (600)  GTTTTGGCAGTACATCAATGGGCGTAGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTCTTGGCACCAA
9G11      (600)  GTTTAGGCAGTACACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
9G12      (600)  GTTTTGGCGGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
9G4       (600)  GTTTTGGCAGTACACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
9G7       (600)  GTTTTGGCAGTACACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
9G8       (600)  GTTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
AD169     (600)  GTTTTGGCAGTACACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
Towne     (600)  GTTTTGGCAGTACATCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA
Consensus (601)  GTTTTGGCAGTACACCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGGCACCAA

                    701                                                                               800
10B2      (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAATGCTCGTT
11E2      (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
12C9      (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACTCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
12E1      (683)  --------CGGTCTATGACGCAAATGTGCTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAATGCTCGTT
12H9      (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
3C9       (701)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
4B5       (683)  --------CGGTCTATGACGCAAATGGGCTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
6A8       (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
6B2       (683)  --------CGGTCTATGACGCAAATGTGCTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
6D4       (683)  --------CGGTCTATGACGCAAATGTGCTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
6F6       (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
9E1       (507)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCC-GTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
9F11      (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
9G11      (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
9G12      (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
9G4       (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
9G7       (700)  AGTCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
9G8       (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
AD169     (700)  AATCAACGGGACTTTCCAAAATGTCGTAACAACTCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
Towne     (700)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
Consensus (701)  AATCAACGGGACTTTCCAAAATGTCGTAATAACCCCGCCCCGTTGACGCAAATGGGCGTAGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTT
```

Figure 8E: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

Figure 8F: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

```
                                 1001                                                                  1100
10B2      (998)   CTTGGGGGTCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCACTCCCTATTGG
11E2      (989)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTCCCCCTATTGG
12C9      (898)   -------------------------------------------------------------------------------------------
12E1      (947)   CTTGGGGTCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
12H9      (998)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
3C9       (999)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
4B5       (946)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
6A8       (998)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
6B2       (946)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
6D4       (946)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
6F6       (988)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
9E1       (805)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
9F11      (996)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
9G11      (998)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
9G12      (998)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
9G4       (998)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
9G7       (988)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
9G8       (998)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
AD169     (998)   CTTGGGGTCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
Towne     (998)   CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG
Consensus (1001)  CTTGGGGCCTATACACACCCCGCTTCCTTATGCTATAGGTGATGGTATAGCTTAGCCTATAGGTGTGGGTTATTGACCATTATTGACCACTCCCTATTGG

                                 1101                                                                  1200
10B2      (1098)  TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
11E2      (1089)  TGACGATACTTTCCATTACTAATCCATAACATGGCTCTTTGCCACCAGCTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
12C9      (898)   -------------------------------------------------------------------------------------------
12E1      (1047)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
12H9      (1098)  TGACGATACTTTCCATTACTAATCCATAATCCATAACAGGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
3C9       (1099)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
4B5       (1046)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
6A8       (1098)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
6B2       (1046)  TGACGATACTTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
6D4       (1046)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
6F6       (1088)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
9E1       (905)   TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
9F11      (1096)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
9G11      (1098)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
9G12      (1098)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
9G4       (1098)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
9G7       (1088)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
9G8       (1098)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
AD169     (1098)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
Towne     (1097)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
Consensus (1101)  TGACGATACTTTCCATTACTAATCCATAATCCATAACATGGCTCTTTGCCACAACTATCCTATTGGCTATATGCCAATACTCTGTCCTTCAGAGACTGACACGGAC
```

Figure 8G: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

```
                 1201                                                                                      1300
10B2      (1198) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACCACCGTCCCAGTGCCCGCAGTTTTTGTTAAACATAGCGTGG
11E2      (1189) TCTGTATTTTTACAGGATGGGGTCTCATTTATTATTTACAAATTCACATATACAACACAACAACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
12C9      (898)  --------------------------------------------------------------------------------------------------
12E1      (1147) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
12H9      (1198) TCTGTATTTTTACAGGATGGGGTCTCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
3C9       (1199) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
4B5       (1146) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
6A8       (1198) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
6B2       (1146) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAACGTGG
6D4       (1146) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
6F6       (1188) TCTGTATTTTTACAGGATGGGGTCTCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
9E1       (1005) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
9F11      (1196) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
9G11      (1198) TCTGTATTTTTACAGGATGGGGTCTCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
9G12      (1198) TCTGTATTTTTACAGGATGGGGTCTCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
9G4       (1198) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
9G7       (1188) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
9G8       (1198) TCTGTATTTTTACAGGATGGGGTCTCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAACGTGG
AD169     (1198) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG
Towne     (1197) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTG.
Consensus (1201) TCTGTATTTTTACAGGATGGGGTCCCATTTATTATTTACAAATTCACATATACAACACAACACCGTCCCGCAGTTTTTATTAAACATAGCGTGG

                 1301                                                                                      1400
10B2      (1298) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
11E2      (1289) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
12C9      (898)  --------------------------------------------------------------------------------------------------
12E1      (1247) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
12H9      (1298) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
3C9       (1299) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
4B5       (1246) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
6A8       (1298) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGAC
6B2       (1246) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
6D4       (1246) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
6F6       (1288) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
9E1       (1105) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
9F11      (1296) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
9G11      (1298) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
9G12      (1298) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
9G4       (1298) GATCTCCACGCGAAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
9G7       (1288) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
9G8       (1298) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
AD169     (1298) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGGGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGAC
Towne     (1297) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
Consensus (1301) GATCTCCACGCGAATCTCGGGTACGTGTTCCGGACATGGCTCTTCTCCGGTAGCGGCGGAGCTTCCACATCCGAGCCCTGGTCCATGCCTCCAGCGGC
```

Figure 8H: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

Figure 8I: Comparison of 18 chimeric promoter sequences generated by DNA shuffling using CMV promoter nucleic acid sequences from AD169 and Towne human strains and Rhesus and Vervet monkey strains as parental sequences.

Vector for promoter evolution

Fig. 9

19/23
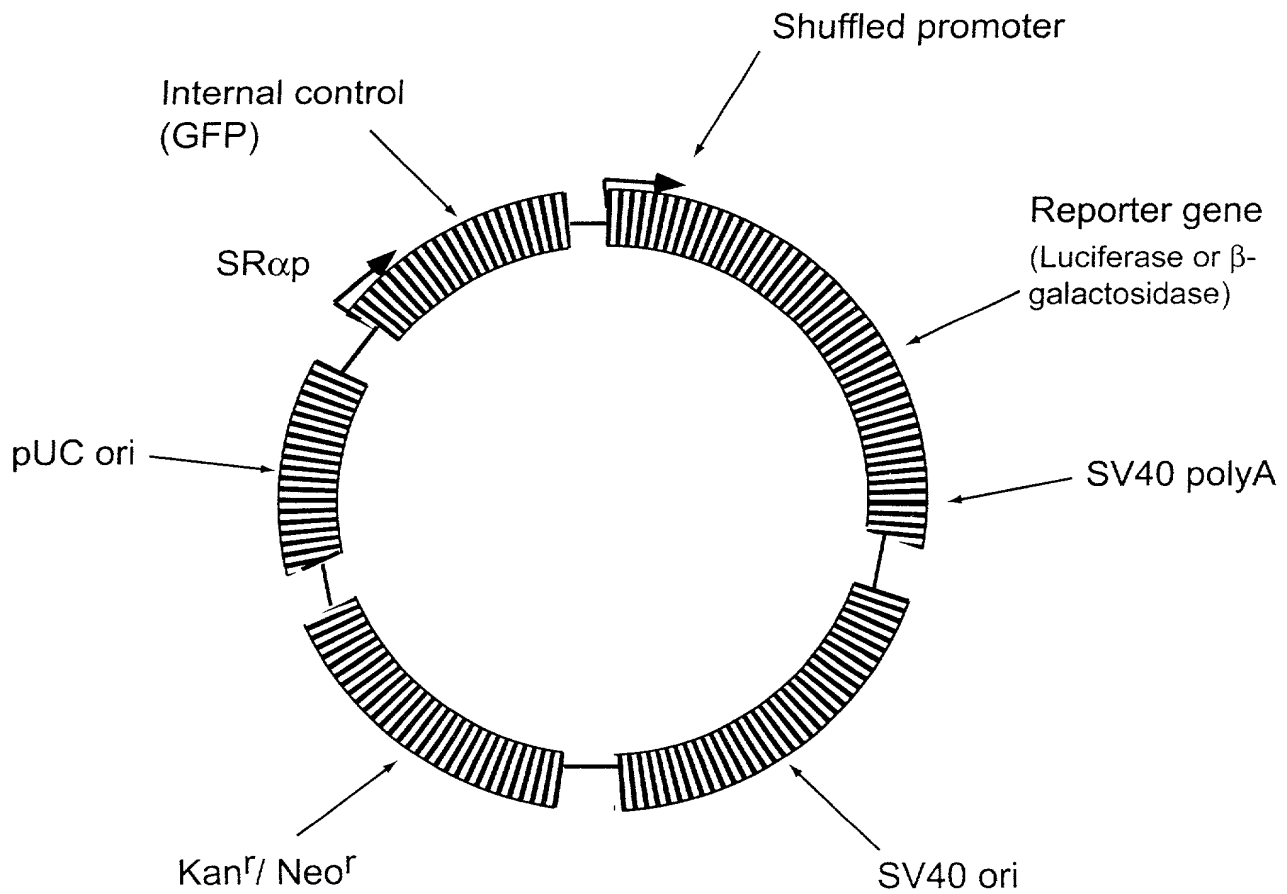
Figure 10A

Towne_promoter_fr_PCR_prod_seq: `ATA....TGAGGCTATATCGCCGATAGAGGCGACATCAAGCTGGCACATGGCCAATGCAT`
Rhesus_monkey_PCR_prod_821bp: `ACT.....TGGCACGGTGCCAA.GTTTGGGGCGGGGTC...TTGGCACCGTGCCAA......`
Vervet_(Simian)_PCR_product_seq: `ATTGAATTGGCATGGTGCCAATAATGGCGGC..CATA...TTGGCTATATGCCA......`

60

Towne_promoter_fr_PCR_prod_seq: `ATCGATCTATACATTGAATCAATATTGGCAATTAGCCATATAGTCATTGGTTTATATAGC`
Rhesus_monkey_PCR_prod_821bp: `...GTCCGCCATATTGGTTTGGCAT.....ATGTCCAATATATTGAT...CCATATAGC`
Vervet_(Simian)_PCR_product_seq: `..............GGATCAATAT.....ATAGGCAATATC.........CAATTTGGC`

120

Towne_promoter_fr_PCR_prod_seq: `ATAAATCAATATATTGGCTATTGGCCATTGCATACGTTGTATCTATATCATAATATGTACAT`
Rhesus_monkey_PCR_prod_821bp: `CAATATCCAATATGGCTAATAGCCA...........GGTTCAATAGAATGGCCAATAAGC`
Vervet_(Simian)_PCR_product_seq: `CCTATGCCAATATGGCTATTGGCCA...........GGTTCAATACTATGTATTGGCCCT`

180

Towne_promoter_fr_PCR_prod_seq: `TTATATTGGCTCATGTCCAATATGACCGCCATGTTGACATTGATTATTCACTAGTT..AT`
Rhesus_monkey_PCR_prod_821bp: `CAATAT..GCCATTGGCCAACATGGCAA.TGGGCCAGTATTGATTATAGCCAATAT..AT`
Vervet_(Simian)_PCR_product_seq: `ATGCCA..TATAGTATTCCATATATGGGTTTTCCTATTGACGTAGATAGCCCCTCCCAAT`

240

Figure 10B

```
                                                                            300
241 Towne_promoter_fr_PCR_prod_seq    TAATAGTA......ATCAATTACGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGC
    Rhesus_monkey_PCR_prod_821bp      AGGCAATA......ATCCATATTGG...CATATGTCCATATTGCCTATAGCCATATTGGC
    Vervet_(Simian)_PCR_product_seq   GGGCGGTCCATATACCCATATATGG...GGCTTCCTAATACCGCCCATAGCCACTCCCCCC

                                                                            360
301 Towne_promoter_fr_PCR_prod_seq    GT...T..ACATAACTTACGGTAAAATGGCCCGCCTCGTGACCGCCCAACGACCCCGCCC
    Rhesus_monkey_PCR_prod_821bp      TTATGT..CCATTACCAATACCATATATGGTCTTCCTATATACGTCATAGGTACCGCCC
    Vervet_(Simian)_PCR_product_seq   AT...TGACGTCAATGGTGTCTCTATATATGGTCTTTCCTATTGACGTCATATGGGCGGTCC

                                                                            420
361 Towne_promoter_fr_PCR_prod_seq    .ATTGACGT.....................CAA
    Rhesus_monkey_PCR_prod_821bp      .ATTGACGTAATATGGATACGCCTCCATTGACGTCAATGGGAGGGATTAATATACGTCAC
    Vervet_(Simian)_PCR_product_seq   TATTGACGTA.TATGGGCGCCTCCCCCCATTGACGTCAATTACGGTAAAATGGCCCGCCTGGC

                                                                            480
421 Towne_promoter_fr_PCR_prod_seq    TAATGACGTATGTTCCCAT......................AGTAACGCCAATAGGG..ACTTTCCA
    Rhesus_monkey_PCR_prod_821bp      TAATACCGCCCATTGACGTGTATAGGACCGTCCCATTGACGTCAATAGCCCACCTCCCA
    Vervet_(Simian)_PCR_product_seq   T..CAATGCCCATTGACGT..............CAATAGGACCACCACCACCA
```

Figure 10C

```
481
Towne_promoter_fr_PCR_prod_seq    TTGACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTT.........GGCAGTAC
Rhesus_monkey_PCR_prod_821bp      TTGACGTCAATGGG.........GTGGCCCATTGCCCATTC.................
Vervet_(Simian)_PCR_product_seq   TTGACGTCAATGGG.........ATGGCTCATTGCCCATTCATATCCGTTC.........
                                                                                      540

541
Towne_promoter_fr_PCR_prod_seq    ATCAAGTGTATCATATGCCAAGTCCGGCCCCCTATTGACGTCAATGACGGTAAATGGCCC
Rhesus_monkey_PCR_prod_821bp      ...................CCACGCCCCCTATTGACGTCAATGACGGTAAATGGCC.
Vervet_(Simian)_PCR_product_seq   ...................TCACGCCCCCTATTGACGTCAATGACGGTAAATGGCC.
                                                                                      600

601
Towne_promoter_fr_PCR_prod_seq    GCCTGGCATTATGCCCAGTACACATGACCTTACGGGACTTTCCTACTTGGCAGTACATC..T
Rhesus_monkey_PCR_prod_821bp      ..................................CACTTGGCAGTACATCAAT
Vervet_(Simian)_PCR_product_seq   ..................................CACTTGGCAGTACATCAAT
                                                                                      660

661
Towne_promoter_fr_PCR_prod_seq    ACGTATTAGTCATCGCTATTACCATGGTGATGCGGTTTGGCAGTACACCAA.........
Rhesus_monkey_PCR_prod_821bp      ACCTATTAATAGTAACT..TGGCAAGTAAATGGGTACTTGGCAGTACACCAAGG..TACAT
Vervet_(Simian)_PCR_product_seq   ATCTATTAATAGTAACT..TGGCAAGTACATTACTATTGGCAAGTACGCCAAGGGTACAT
                                                                                      720
```

Figure 10D

```
                                    721                                              780
Towne_promoter_fr_PCR_prod_seq      ...........TGGGGCGTGGATAGCGGT..TTGACTCACGGGGATTTCCAAGTCTC
Rhesus_monkey_PCR_prod_821bp        TGGCAG.TACTCCCATTGACGTCAATGGCGGTAAATGGCCCGCCAAGTACA
Vervet_(Simian)_PCR_product_seq     TGGCAGGTACTCCCATTGACGTCAATGGCGGTAAATGGCCCGGCATGGCTGCCAAGTACA

                                    781                                              840
Towne_promoter_fr_PCR_prod_seq      ...CACCCCATTGACGTCAAATGGGAGTTTGTTTTGGCACCAAAATCAACGGGACTTTCCA
Rhesus_monkey_PCR_prod_821bp        ...TGCCC.ATTGACGTCAATGGGG....................
Vervet_(Simian)_PCR_product_seq     ACATCCCC.ATTGACGTCAATGGGAA...................

                                    841                                              900
Towne_promoter_fr_PCR_prod_seq      AAATGTCGTAATAACCCCGCCCCCGTTGACGCAAATGGGCG...............
Rhesus_monkey_PCR_prod_821bp        ...............CGGTCCTATGACGTCAATGGGCG..............
Vervet_(Simian)_PCR_product_seq     ..............GGGGCAATGACGCAAATGGGCGTTCCATTGACGTAAATGGCG

                                    901                                              960
Towne_promoter_fr_PCR_prod_seq      GTAGGGCGTGTACGGTGGGAGGTCTATATAAGCAGAGCTCGTTTAGTGAACCGTCAGATCG
Rhesus_monkey_PCR_prod_821bp        GTAGGGCGTGC.CTATGGGCGGTCTATATAAGCAATGCACGTTTAGGAACCGCCATTCTG
Vervet_(Simian)_PCR_product_seq     GTAGGGCGTGCCTAATGGGAGGTCTATATAAGCAATGCTCGTTTAGGAACCGCCATTCTG
```

Figure 10E

```
                                           1020
961    CCTGGAGAGCGCCATCCACGCTGTGTTTGACCTCCAT.AGAAGACACCGGG.ACCGATCCAG
Towne_promoter_fr_PCR_prod_seq

       CCTGGGGACGTCG..........GAGGAGCACCAT.AGAAGGTACCGGGGACCGATCCAG
Rhesus_monkey_PCR_prod_821bp

       CCTGGGGACGTCG..........GAGGAGCTCCATTGGAAGAGACCGGG.ACCGATCCAG
Vervet_(Simian)_PCR_product_seq
```

```
                                           1057
1021   CCTCCGCGGCCGGGAACGGTGCATTGGAACGCGGATT                          SEQ ID NO:20
Towne_promoter_fr_PCR_prod_seq

       CCTCCATAGCCGGGAAGGGTGCATTGGAACGCGGATA                          SEQ ID NO:22
Rhesus_monkey_PCR_prod_821bp

       CCTCCATAGCCGGGGACGGTGCATTGGAATGCGGATA                          SEQ ID NO:23
Vervet_(Simian)_PCR_product_seq
```